Electronic Version
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Claims

[c1] What is claimed is:

1. A data driver used in a current-driving display device for receiving a digital signal and for outputting a gray-scale current signal to drive a data line of the display device, the data driver comprising:

a digital-to-analog current converter for transforming the digital signal into an analog current signal;

a current storing/reproducing module for storing a predetermined voltage required for conducting the analog current signal in a transforming/storing status and for conducting a duplicate current signal to the data line in a reproducing/sustaining status; and

a control circuit electrically connected between the digital-to-analog current converter and the current storing/reproducing module for providing a switch between the transforming/storing status and the reproducing/sustaining status;

wherein the duplicate current signal is the gray-scale current signal, and the duplicate current signal is almost equal to the analog current signal.

[c2] 2. The data driver of claim 1, wherein the duplicate cur-

rent signal is generated by the predetermined voltage.

[c3] 3. The data driver of claim 1 further comprising at least a level shifter for adjusting voltage levels of the digital signal.

[c4] 4. The data driver of claim 1 further comprising a shift register for outputting a switch signal to the control circuit to switch the data driver between the transforming/storing status and the reproducing/sustaining status.

[c5] 5. The data driver of claim 4, wherein if the switch signal is at a high potential level, the data driver is in the transforming/storing status, and the control circuit connects the digital-to-analog current converter to the current storing/reproducing module to conduct the analog current signal generated by the digital-to-analog current converter to the current storing/reproducing module, wwhich storesthe predetermined voltage required for conducting the analog current signal.

[c6] 6. The data driver of claim 5, wherein the current storing/reproducing module comprises at least a capacitor and a plurality of MOS transistors or TFTs, and the predetermined voltage is a gate-to-source voltage drop (Vgs) of a transistor.

[c7] 7. The data driver of claim 4, wherein if the switch signal

is at a low potential level, the data driver is in the reproducing/sustaining status, and the control circuit will disconnect the route between the digital-to-analog current converter and the current storing/reproducing module and conduct the duplicate current signal to the data line.

[c8] 8. The data driver of claim 1, wherein the digital-to-analog current converter is a current-steering digital-to-analog current converter or another digital-to-analog current converter.

[c9] 9. The data driver of claim 1, wherein the display device is an OLED display device, a PLED display device, or another current-driving display device.

[c10] 10. A data driver used in a current-driving display ddevice forreceiving a digital signal and for driving a data line of the display device, the data driver comprising:
at least a level shifter for adjusting voltage levels of the digital signal;
a current-steering digital-to-analog current converter electrically connected to the level shifter for transforming the digital signal into an analog current signal;
a current storing/reproducing module for storing a predetermined voltage required for conducting the analog current signal in a transforming/storing status, and for conducting a duplicate current signal to the data line in a

reproducing/sustaining status, wherein the duplicate current signal is generated by the predetermined voltage; and

a control circuit electrically connected between the digital-to-analog current converter and the current storing/reproducing module for providing a switch between the transforming/storing status and the reproducing/sustaining status;

wherein the duplicate current signal is almost equal to the analog current signal.

[c11] 11. The data driver of claim 10 further comprising a shift register for outputting a switch signal to the control circuit to switch the data driver between the transforming/storing status and the reproducing/sustaining status.

[c12] 12. The data driver of claim 11, wherein if the switch signal is at a high potential level, the data driver is in the transforming/storing status, and the control circuit connects the digital-to-analog current converter to the current storing/reproducing module to conduct the analog current signal generated by the digital-to-analog current converter to the current storing/reproducing module, which stores the predetermined voltage required for conducting the analog current signal.

[c13] 13. The data driver of claim 12, wherein the current

storing/reproducing module comprises at least a capacitor and a plurality of MOS transistors or TFTs, and the predetermined voltage is a gate-to-source voltage drop (Vgs) of a transistor.

[c14] 14. The data driver of claim 11, wherein if the switch signal is at a low potential level, the data driver is in the reproducing/sustaining status, and the control circuit will disconnect the route between the digital-to-analog current converter and the current storing/reproducing module and conduct the duplicate current signal to the data line.

[c15] 15. The data driver of claim 14, wherein the display device further comprises a plurality of pixels corresponding to the data line and a plurality of scan lines corresponding to the plurality of pixels, wherein when the data driver is in the reproducing/sustaining status, at least a scan line will operate the corresponding pixel so that the data line can conduct the duplicate current signal to the corresponding pixel.

[c16] 16. The data driver of claim 15, wherein each pixel is a current storing/reproducing pixel.

[c17] 17. The data driver of claim 10, wherein the display device is an OLED display device, a PLED display device, oor

anothercurrent-driving display device.